

Amendments to the Claims

The listing of claims below will replace all prior versions and listings of claims in the present application. Please cancel claims 1, 2, 4-8, 10-14, 17 and 22-25. Please add the following new claims:

Claim Listing

1-25. (Cancelled)

26. (New) A method for making an electrical-energy-storage unit comprising components fabricated by the method steps as follow:

- a) preparing a wet-chemical-prepared calcined composition-modified barium titanate powder derived from a solution of precursors: $\text{Ba}(\text{NO}_3)_2$, $\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$, $\text{Nd}(\text{NO}_3)_3 \cdot 6\text{H}_2\text{O}$, $\text{Y}(\text{NO}_3)_3 \cdot 4\text{H}_2\text{O}$, $\text{Mn}(\text{CH}_3\text{COO})_2 \cdot 4\text{H}_2\text{O}$, $\text{ZrO}(\text{NO}_3)_2$, and $[\text{CH}_3\text{CH}(\text{O}-)\text{COONH}_4]_2\text{Ti}(\text{OH})_2$ in deionized water heated to 80°C , and a separate solution of $(\text{CH}_3)_4\text{NOH}$ made in deionized water and heated to 80°C - 85°C , then mixing the solutions by pumping the heated ingredient streams simultaneously through a coaxial fluid mixer producing coprecipitated powder, then collecting the coprecipitated powder in a down-out vessel and refluxing at a temperature of 90°C - 95°C for 12 hours, then filtering, washing with deionized-water, drying, and then calcining 1050°C in air;
- b) fabricating an aluminum oxide (Al_2O_3) coating of 100 \AA thickness onto the wet-chemical-prepared calcined composition-modified barium titanate powder, with the use of aluminum nitrate nonahydrate precursor applied by wet chemical means, then calcining at 1050°C , resulting in a single-coated calcined composition-modified barium titanate powder;
- c) fabricating onto the alumina-coated composition-modified barium titanate powder, a second uniform coating of 100 \AA of calcium magnesium aluminosilicate glass derived from alcohol-soluble precursors: calcium methoxide or calcium isopropoxide, magnesium methoxide or magnesium ethoxide, aluminum ethoxide or aluminum isopropoxide, and tetraethyl

- 24 orthosilicate are applied by wet chemical means which upon calcining at
25 500° C results in a double-coated composition-modified barium titanate
26 powder;
- 27 d) blending, this double-coated composition-modified barium titanate powder
28 with a screen-printing ink containing appropriate plastic resins,
29 surfactants, lubricants, and solvents to provide a suitable rheology for
30 screen printing;
- 31 e) screen-printing into interleaved multilayers of alternating offset
32 nickel electrode layers **12** and double-coated calcined composition-
33 modified barium titanate high-relative-permittivity layers **11** with the use
34 of screening inks having the proper rheology for each of the layers;
- 35 f) drying and cutting the screen-printed multilayer components **15** into
36 a specified rectangular area;
- 37 g) sintering the screen-printed multilayer components **15**, first at a temperature of
38 350° C for a specified length of time, then at 850° C for a specified length
39 of time, to form closed-pore porous ceramic bodies;
- 40 h) hot isostatically pressing the closed-pore porous ceramic bodies, at a
41 temperature of 700° C with a specified pressure, into a void-free
42 condition;
- 43 i) grinding and each side of the component to expose the alternating offset
44 interleaved nickel electrodes **12**;
- 45 j) connecting nickel side bars **14** to each side of the components **15**, that have the
46 interleaved and alternating offset nickel electrodes **12** exposed, by
47 applying nickel ink with the proper rheology to each side and clamping the
48 combinations together;
- 49 k) heating the components and side nickel bar combination **14-15** at 800° C for a
50 time duration of 20 minutes to bond them together;
- 51 l) wave soldering each side of the conducting bars;
- 52 m) assembling the components **15** with the connected nickel side bars **14** into the
53 first array, utilizing unique tooling and solder-bump technology;
- 54 n) assembling the first arrays into the second array; and

55 o) assembling the second arrays into the EESU final assembly.

1 27. (New) The method of claim 26 wherein a second coating of glass is
2 provided onto the double-coated composition-modified barium titanate powder being in
3 contact with the nickel electrodes and having an applied working voltage of 3500 V
4 across the parallel electrodes.

1 28. (New) The method of claim 26 wherein a dielectric voltage breakdown
2 strength of 5.0×10^6 V/cm is achieved across the electrodes of the components.

1 29. (New) The method of claim 26 wherein the method provides an ease of
2 manufacturing due to the softening temperature of the calcium magnesium
3 aluminosilicate glass allowing the relatively low hot-isostatic-pressing temperatures of
4 700° C which in turn provides a void-free ceramic body.

1 30. (New) The method of claim 26 wherein the method provides an ease of
2 fabrication due to the softening temperature of the calcium magnesium aluminosilicate
3 glass allowing the relatively low hot-isostatic-pressing temperatures of 700° C which in turn
4 allows the use of nickel for the conduction-path electrodes rather than expensive platinum,
5 palladium, or palladium-silver alloy.

1 31. (New) The method of claim 26 wherein the method provides an ease of
2 fabrication due to the softening temperature of the calcium magnesium aluminosilicate
3 glass allowing the relatively low hot-isostatic-pressing temperatures of 700° C, which feature
4 along with the coating method provided a uniform-thickness shell of the calcium
5 magnesium aluminosilicate glass and in turn provides hot-isostatic-pressed double-coated
6 composition-modified barium titanate high-relative-permittivity layers that are uniform and
7 homogeneous in microstructure.

1 32. (New) The method of claim 26 wherein the method provides the double
2 coating of the basis particles of the composition-modified barium titanate powder thereby

3 reducing the leakage and aging of this material by an order of magnitude of the
4 specification of this basis material, thus reducing the discharge rate to 0.1% per 30 days.

1 33. (New) The method of claim 26 wherein the method provides a double coating
2 of the composition-modified barium titanate powder, the hot-isostatic-pressing process, the
3 high-density solder-bump packaging, and along with the double-layered array configuration
4 store 52,220 W•h of electrical energy in a 2005 inches³ container.

1 34. (New) The method of claim 26 wherein the method provides materials used:
2 water-soluble precursors of barium (Ba), calcium (Ca), titanium (Ti), zirconium (Zr),
3 manganese (Mn), yttrium (Y), neodymium (Nd), forming the composition-modified
4 barium titanate powder, and the metals: nickel (Ni), and copper (Cu), which are not
5 explosive, corrosive, or hazardous.

1 35. (New) The method of claim 26 wherein the method provides an EESU that is
2 not explosive, corrosive, or hazardous and therefore is a safe product when used in
3 electrical vehicles, which include bicycles, tractors, buses, cars, or any device used for
4 transportation or to perform work.

1 36. (New) The method of claim 26 wherein the method provides an EESU which
2 can store electrical energy generated from solar voltaic cells or other alternative sources
3 for residential, commercial, or industrial applications.

1 37. (New) The method of claim 26 wherein the method provides an EESU which
2 can store electrical energy from the present utility grid during the night when the demand
3 for electrical power is low and then deliver the electrical energy during the peak power
4 demand times and thus provide an effective power averaging function.

1 38. (New) The method of claim 26 wherein the method provides a double
2 coating of the composition-modified barium titanate powder and a hot-isostatic-pressing
3 process which together assists in allowing an applied voltage of 3500 V to a dielectric
4 thickness of 12.76×10^{-6} m to be achieved.

1 39. (New) The method of claim 26 wherein the method provides an EESU which
2 when fully discharged and recharged, the EESU's initial specifications are not degraded.

1 40. (New) The method of claim 26 wherein the method provides an EESU which
2 can be safely charged to 3500 V and stored at least 52.22 kW•h of electrical energy.

1 41. (New) The method of claim 26 wherein the method provides an EESU that
2 has a total capacitance of at least 31 F.

1 42. (New) The method of claim 26 wherein the method provides an EESU that
2 can be rapidly charged without damaging the material or reducing its life.